



3.0 Current Portfolio and Funding Opportunities

This chapter offers a description of the SSL current funding mechanisms, and an overview of the projects in the current project portfolio.

3.1. Current SSL Project Portfolio

This section provides an overview of the current projects in the SSL portfolio (as of July 2006). The SSL Project Portfolio is grouped into four topic areas:

- Group 1: Inorganic SSL Core Technology Research
- Group 2: Inorganic SSL Product Development
- Group 3: Organic SSL Core Technology Research
- Group 4: Organic SSL Product Development

Within each of the four grouped topic areas, the Department's SSL R&D agenda is further divided into "tasks" and "subtasks". At the consultative workshops, participants discuss each of the tasks and subtasks, and provide recommendations for prioritizing R&D activities over the next 1-2 years. Detail on the current priority subtasks is presented in the tables in this section. Under each subtask there are a number of "projects" representing specific efforts by researchers to address the goals of that subtask.

3.2. Congressional Appropriation and the Current Portfolio (July 2006)

Figure 3-1 presents the congressional appropriation for the SSL portfolio from FY2003 to FY2006. The funding request for FY2007, totaling \$19.3 million, is also represented. The program's funding level increased from \$3 million in FY2003 to \$12.7 million in FY 2005. For the current fiscal year (FY2006, which began in October 2005), the final funded amount was \$13 million. A Congressional Directive in FY2006 also added an additional \$5 million in funding for solid-state lighting R&D.

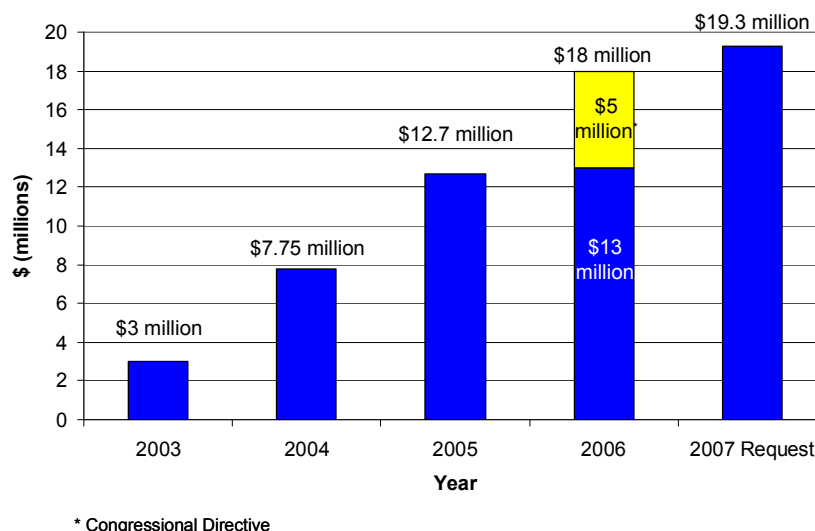


Figure 3-1: Congressional Appropriation for SSL Portfolio, 2003-2006



The current SSL DOE research portfolio²⁴ (not including completed projects) includes sixty projects, which address LEDs, OLEDs, and additional SSL technologies. Projects balance long-term and short-term activities, as well as large and small business and university participation. The portfolio totals more than \$87.1 million in cumulative government and industry investment. Figure 3-2 provides a graphical breakdown of the funding for the current SSL project portfolio; this value represents cumulative funding levels for projects awarded over the last three years. The Department is currently providing \$67.2 million in funding for the projects, and the remaining \$20.0 million is cost-shared by project awardees. Of the sixty projects active in the SSL R&D portfolio through 2006, thirty-six were associated with LEDs and twenty-four were focused on OLEDs. The LED project partners had a slightly higher cost-share contribution (\$11.8 million) than the OLED project partners (\$8.2 million).

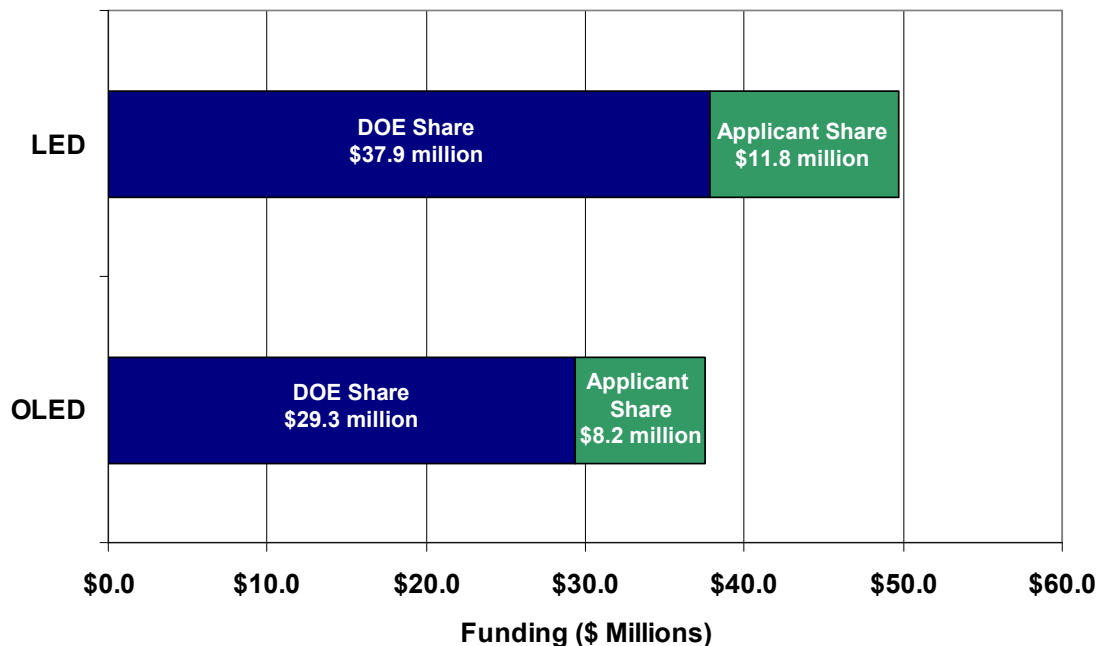


Figure 3-2: Cumulative Funding of SSL R&D Project Portfolio, July 2006

Figure 3-3 shows the DOE funding sources and level of support contributing to the SSL project portfolio, for projects active in July in 2006. The Building Technologies Program in the Office of Energy Efficiency and Renewable Energy (EERE) provided the majority of the funding; forty-one projects receive \$78.2 million in funding from this source. Approximately 64 percent (\$50.1 million) is directed to fund Core Technology Research projects and with the balance 36 percent (\$28.1 million) supporting Product Development projects. The Small Business Innovation Research (SBIR) program in the Office of Science funded eighteen projects for a total of \$8.3 million. The EE Science program in the Office of EERE provided \$0.6 million in funding for one project.

²⁴ As of July 2006.

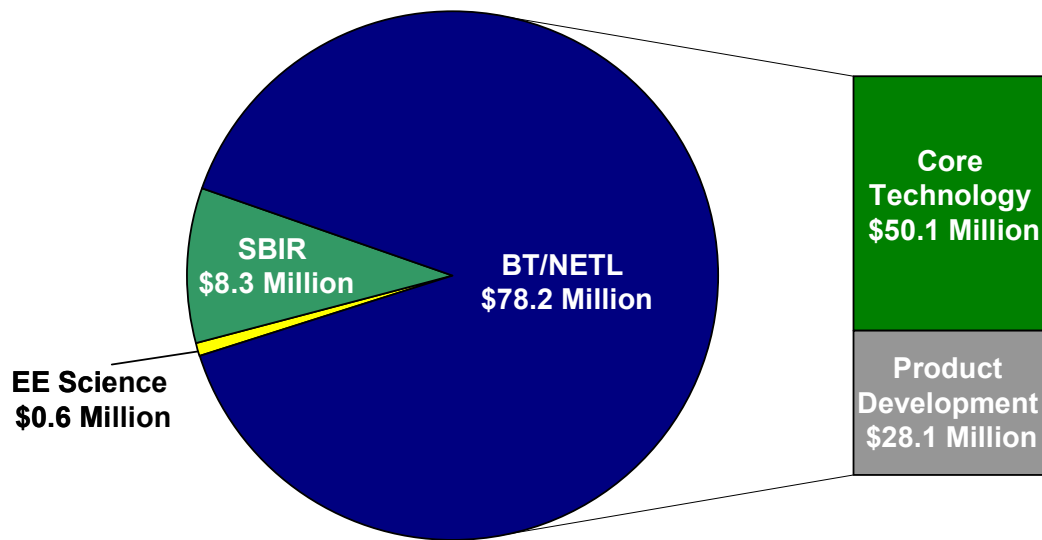


Figure 3-3: Cumulative SSL R&D Portfolio: Funding Sources, July 2006

The Department supports SSL R&D in partnership with industry, small business, academia, and national laboratories. Figure 3-4 provides the approximate level of R&D funding contained in the current SSL portfolio among the four general groups of SSL R&D partners. Industry participants receive approximately 32% of portfolio funding, with \$27.9 million in R&D activities. Small business comprises the next largest category receiving 31%, or \$27.2 million, in research funds. Finally, universities and national laboratories comprise 23% and 14% of the R&D portfolio, respectively.

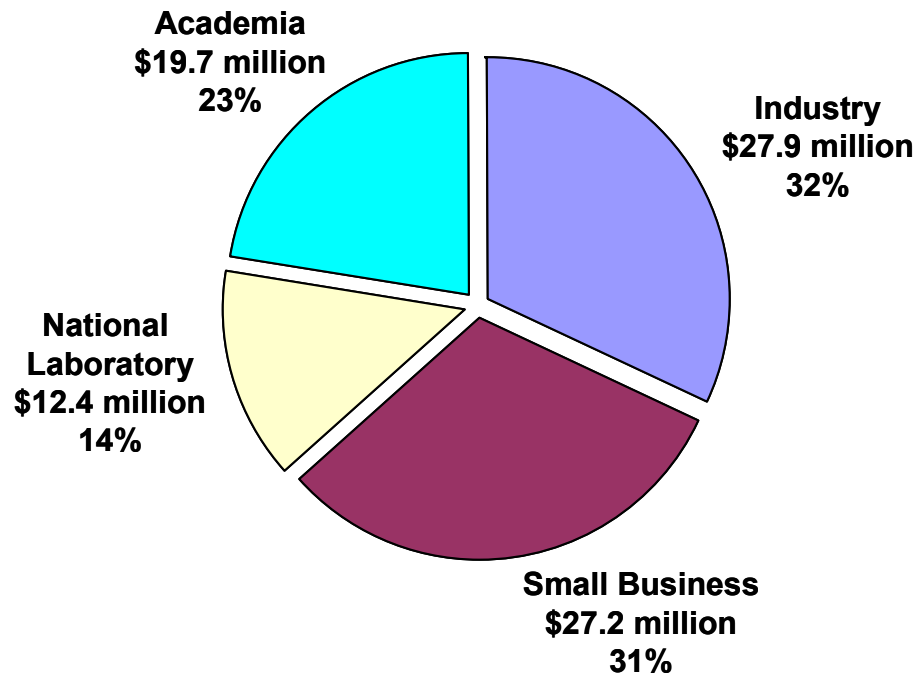


Figure 3-4: 2006 SSL R&D Project Portfolio: Recipients of DOE Funding, July 2006

Table 3-1 and Table 3-2 show the total number of projects and total-project funding in the SSL portfolio by subtask (as of July 2006). During the SSL workshop held in November 2003, participants suggested research areas that required emphasis at that time in order to advance SSL technology toward the goal of general illumination. Table 3-1 shows the projects that DOE chose to fund, in keeping with these priorities, under the *Core Technology Research* solicitations.



Table 3-1: SSL R&D Portfolio: Core Technology (July 2006)

	Number of Projects	Funding (\$)
Light-Emitting Diode		
Large-area substrates, buffer layers, and wafer research	1	\$0.8 million
High-efficiency semiconductor materials	16	\$22.1 million
Device approaches, structures, and systems	2	\$3.7 million
High-efficiency Phosphors and conversion materials	6	\$7.0 million
Encapsulants and packaging materials	1	\$0.1 million
Design and development of in-situ diagnostic tools for the substrate and epitaxial process	1	\$0.4 million
Research into low-cost, high efficiency reactor designs and manufacturing methods	1	\$0.8 million
Total LED	28	\$34.8 million
Organic Light-Emitting Diodes		
Substrate materials for electro-active organic devices	2	\$0.9 million
High-efficiency, low voltage, stable OLED materials	10	\$12.3 million
Improved contact materials and surface modification techniques to improve charge injection	1	\$0.7 million
Strategies for improved light extraction and manipulation	2	\$1.8 million
Approaches to OLED structures between the electrodes for improved-performance low-cost white-light devices	1	\$0.8 million
Research on low-cost transparent electrodes	2	\$2.9 million
Investigation (theoretical and experimental) of low-cost fabrication and patterning techniques and tools	1	\$4.0 million
Total OLED	19	\$23.3 million
TOTAL	47	\$58.1 million

Table 3-2 shows the projects that are currently funded in *Product Development* (as of July 2006).



Table 3-2: SSL R&D Portfolio: Product Development (July 2006)

	Number of Projects	Funding (\$)
Light-Emitting Diode		
High-efficiency semiconductor materials	1	\$1.9 million
Implementing strategies for improved light extraction and manipulation	2	\$3.7 million
Optical coupling and modeling	3	\$6.5 million
Electronics development	2	\$2.7 million
Total LED	8	\$14.8 million
Organic Light-Emitting Diodes		
Develop architectures that improve device robustness, increase lifetime and increase efficiency	5	\$14.2 million
Total OLED	5	\$14.2 million
TOTAL	13	\$29.0 million

3.2.1. Summary of Current Research Tasks and Timeline

The following Gantt chart, shown in Table 3-3 provides a high level summary of the current research and development tasks the Department is funding.²⁵ This chart presents the timeline of projects, past and current, grouped by funding source and categorized by task.

²⁵ The information is derived from the *2005 Project Portfolio: Solid State Lighting*, available at http://www.netl.doe.gov/ssl/PDFs/SSL%20Portfolio%202005_2-03.pdf



Table 3-3: Timeline of Current (FY06) and Completed Projects

